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# CROPS RESEARCH

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CURRENT SERIAL RECORDS

X<sup>3</sup> RIO

## A New Disease-Resistant Variety of Sweet Sorghum for Southern United-States<sup>1</sup>

X<sup>3</sup> + 3b

36 By O. H. Coleman, W. R. Cowley, D. M. Broadhead, K. C. Freeman, and I. E. Stokes<sup>2 3</sup>

= and others //

Farmers must continually search for new crops and sources of income to meet current demands for effective and profitable agricultural operations. Many farmers, particularly in Southern United States, are interested in sweet sorghum for sirup, for livestock feed, or as a new crop for sugar production.

Disease-resistant varieties of sweet sorghum are available as a result of research initiated by the U.S. Department of Agriculture at Meridian, Miss., in 1938. At that time, available varieties were susceptible to major diseases in Southern United States. As a result of sugar rationing during World War II, the breeding program at Meridian was directed towards the development of superior, disease-resistant varieties for the manufacture of sirup and varieties suitable for sugar production. Three varieties (Sart, Tracy, and Wiley) were released to farmers for sirup production or for forage in Southern United States. The variety Brawley was released as a high-sucrose type in dry areas like the Imperial Valley of California; Rio is the first variety suitable for sugar production in humid areas that has been released to farmers.

Rio (fig. 1) is a midseason variety that matures about 1 week later than Tracy. Under ideal conditions, Rio grows about 1 foot taller than Tracy, and thus is somewhat more susceptible to lodging. The stalks are slightly less juicy than those of Tracy but are higher in sucrose. The seedling is green.

Rio is very resistant to rust and to leaf anthracnose; it is damaged only slightly by cotton insecticides.

<sup>1</sup>Cooperative investigations by the Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture and the Agricultural Experiment Stations of Alabama, Georgia, Louisiana, Mississippi, and Texas.

<sup>2</sup>Research Agronomist, Crops Research Division, Agricultural Research Service, U.S. Department of Agriculture at Meridian, Miss.; Superintendent, Texas Agricultural Experiment Station, Substation No. 15, at Weslaco; and Research Agronomists, Crops Research Division, at Meridian; Cairo, Ga.; and Beltsville, Md., respectively.

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Figure 1.--A field of Rio sweet sorghum at Meridian, Miss., in 1964.

Ellipsoid panicles are normally 8 to 12 inches long and semicompact, but irregularly (fig. 2). Reddish-brown glumes with acute apices extend three-fourths to nine-tenths the length of the seed. Chartaceous margins and base of the glume are usually hirsute, but the main body of the structure is sparsely hirsute. The lemma is awnless.

Irrotational ellipsoid seed of medium size have a white chalky seedcoat underlain by a brown subcoat; the endosperm is mostly corneous.

Rio is a selection from the progeny of a cross between the disease-susceptible variety Rex and the disease-resistant importation MN 1048. Rex is an early maturing, high-sucrose type of unknown origin, selected in Kansas about 1891. MN 1048 was introduced from Equatoria, Africa, in 1945. Rio was selected from an F<sub>2</sub> progeny at Meridian, Miss., in 1949 and after evaluation for several years was advanced to the prevariety tests in 1956 under the breeding number Mer. 55-1.

Some information about the response of Rio in Southern United States is in table 1. The sugar content of Rio was excellent throughout the South and the calculated yield of sugar per ton of stalks approached that of sugarcane. Brawley, a disease-susceptible variety, has juice quality under disease-free conditions equal to or better than Rio, but the yield of stalks is lower. Under growing conditions at Houma, La., where the disease incidence is high, the yield of sugar from Brawley was 106 pounds per ton of stalks compared to 186 pounds from Rio. The yield of sugar per acre from Rio compared favorably with that of sugarcane on a cost per unit basis.



Figure 2.--A panicle of Rio sweet sorgham.

TABLE 1. --Data for the sweet sorghum variety Rio in Southern United States, 1960-64

Location	Expts.	Average yield of stripped stalks per acre	Average laboratory mill juice analyses			Calculated 96 <sup>0</sup> sugar <sup>1</sup>	
			Brix	Sucrose (Pol.)	Coefficient of apparent purity	Per ton	Per acre
	Number	Tons	Degrees	Percent	Percent	Pounds	Pounds
<b>ALABAMA:</b>							
Fairhope <sup>2</sup> .....	1	18.0	22.0	17.2	78.0	238	4,291
Tallassee <sup>2</sup> .....	4	19.2	21.0	14.7	70.0	190	3,648
<b>GEORGIA:</b>							
Cairo.....	2	11.4	21.2	15.3	72.0	201	2,291
<b>LOUISIANA:</b>							
Baton Rouge <sup>2</sup> .....	3	13.0	20.2	16.0	79.2	222	2,886
Curtis <sup>2</sup> .....	4	13.8	19.9	14.2	71.5	186	2,567
Houma.....	5	13.0	17.8	13.6	76.1	186	2,418
<b>MISSISSIPPI:</b>							
Holly Springs <sup>2</sup> .....	1	13.3	18.4	13.9	75.5	189	2,514
Meridian.....	4	15.3	19.3	14.8	76.7	203	3,016
Newton <sup>2</sup> .....	1	20.0	18.1	13.8	76.1	188	3,770
Pontotoc-Flatwoods <sup>2</sup> ..	1	12.4	19.5	15.8	80.9	224	2,773
Pontotoc-Ridge <sup>2</sup> .....	1	19.5	21.2	17.1	80.4	241	4,701
State College <sup>3</sup> .....	1	17.4	21.6	15.2	70.3	197	3,434
Stoneville <sup>2</sup> .....	1	19.0	18.2	14.1	77.2	194	3,691
Verona <sup>2</sup> .....	1	14.9	17.9	13.3	74.2	179	2,666
<b>TEXAS:</b>							
Hereford.....	2	20.7	18.0	13.6	74.8	182	3,767
San Benito.....	2	15.4	23.6	18.3	77.7	253	3,896
Weslaco.....	3	14.2	19.6	15.8	78.3	212	3,010

<sup>1</sup> 75% extraction.

<sup>2</sup> Brought to Meridian and milled 24-30 hours after harvest.

<sup>3</sup> Brought to Meridian and milled 90-100 hours after harvest.

Rio is one of many new lines produced in the breeding program of the Agricultural Research Service at Meridian. Based on limited evaluations, some of the other new lines appear to be comparable to Rio in productive capacity. The improved varieties have been selected from progenies of crosses between superior breeding lines, such as Rio, and commercial varieties, such as Brawley; good qualities of both parents are incorporated in the progenies.

Rio and other breeding lines developed at Meridian have increased the potential of sweet sorghum for sugar production and other uses because of their wide range of adaptability. In areas where sugarcane or sugarbeet is grown for sugar production, sweet sorghum can serve effectively as a supplemental sugar crop; in other areas it can serve as an additional cash crop. Current information indicates that because of the development and availability of the new disease-resistant variety Rio, sweet sorghum is a potential sugar crop in Southern United States; extensive research is needed to develop even better varieties adapted to the various areas of production and also to develop improved manufacturing techniques.

The variety Rio has been released jointly by the Mississippi Agricultural Experiment Station, the Texas Agricultural Experiment Station, and the U.S. Department of Agriculture. Seed will be distributed in 1965 by the Foundation Seed Section, Department of Soil and Crop Sciences, Texas Agricultural Experiment Station, College Station, Tex., and the Mississippi Foundation Seed Stock Program, State College, Miss.

The following persons cooperated with the authors in obtaining the information for this report:<sup>4</sup>

Alabama: C. S. Hoveland, Associate Professor, Alabama Agricultural Experiment Station, Auburn; H. F. Yates, Superintendent, and J. E. Barrett, Assistant Superintendent, Gulf Coast Experiment Station, Fairhope; and J. W. Langford, Superintendent, Plant Breeding Unit, Tallahassee.

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<sup>4</sup>The names of commercial companies are used in this publication solely for the purpose of providing specific information. Mention of a company does not constitute a guarantee or warranty by the U.S. Department of Agriculture or an endorsement by the Department over other companies not mentioned.